Rothschild, M., Y. Schlein and S. Ito. 1986. *A Colour Atlas of Insect Tissues Via the Flea.* Wolfe Publishing Ltd., London. 184 pp., 18 line drawings, 2 colour photographs, 193 photomicrographs in colour (14 of wholemounts), 3 black and white photomicrographs, 16 scanning and 55 transmission electron micrographs, 2 appendices, index. $71.75 Can.

While an undergraduate at Ontario Agricultural College in Guelph in the early 1960's, I had the pleasure of taking a course in insect histology from the late Reg Osborne– not realizing at the time that such formal exposure to this subject was then and still is infrequent. On the first day of class we were presented with a large collection of slices of various insects sectioned sagittally, transversely or horizontally and stained with a variety of stains– more or less faded through passage of time. We had access to Snodgrass' (1935) and Wigglesworth's (1953) textbooks and were expected to learn the characteristics of insect tissues on our own. (One specimen on the final practical was a third instar cabbage white caterpillar, heavily parasitized with braconid larvae sectioned obliquely through its posterior end caudad of the dorsal vessel and ventral nerve cord and stained with an unfamiliar stain). How I wish I had had a copy of this atlas as back up for that course!

To my knowledge this book is unique. As noted by the authors, it fills the gap between Chapman (1982) *The Insects: Structure and Function* and Smith (1968) *Insect Cells: Their Structure and Function* (reviewed in this journal in 1969: *Quaest. Ent.* 5: 213–214) but concentrates on fleas (pupae and adults of 20 species are represented with emphasis on the Rabbit flea, *Spilopsyllus cuniculi* and the Oriental rat flea, *Xenopsylla cheopis*). The reasons they chose fleas as the subjects of their atlas were that these animals are small, relatively simple in structure and have veterinary and medical importance. (The real reason, which isn't mentioned, is that Mariam Rothschild loves fleas and had hundreds of sections already available from her work with Brown [1973] on factors influencing the breeding of the rabbit flea [J. Zool., London 170: 87–137] and with Schlein [1975] on the jumping mechanism of the Oriental rat flea [Phil. Trans. R. Soc., London B. 271: 457–490]).

The book contains: introductory information on techniques used (most specimens were fixed in Bouin Brasil and stained with Heidenhain's azan); 16 beautifully executed 3–dimensional reconstructions by Schlein of the principal internal organs of the Oriental rat flea; a brief synopsis of flea biology; sections describing and illustrating the structure of antennae, mouthparts, salivary glands, alimentary canal, fat body, Malpighian tubules, rectal ampulla and pads, muscles, the flea jump, resilin, male and female reproductive organs, cuticle, setae and spines, connective tissue, dorsal vessel, haemocytes, oenocytes and pericardial cells, respiratory and nervous systems, eyes, pygidial sensilium, micropyles and aeropyles, and corpora cardiaca and allata; and two appendices– I, treating structures not found in fleas, and II, flea parasites and symbionts. Each organ system has a brief introduction, a series of photomicrographs reproduced in colour and usually, one or more scanning (SEM) and/or transmission (TEM) electron micrographs. The structures illustrated on each micrograph are numbered and their identity indicated in a legend printed adjacent to the micrographs. Since these legends are numerous, the same numbers are used for different structures in different organ systems. Most TEM's are labelled with abbreviations explained in the captions. Some organ systems (alimentary canal–35 figs.; male [27 figs.] and female [27 figs.] reproductive systems) are treated much more extensively than others (dorsal vessel–1 fig.) and include information on cellular changes associated with moulting, blood feeding, and/or reproductive cycles.

The microscopic sections chosen for illustration are outstanding and the resulting photomicrographs aesthetically pleasing and beautifully reproduced. They will generate much envy in those of us who are limited by cost of production to publishing our illustrations in the primary literature as black and white halftones, which are not nearly as attractive or informative.

In spite of these strong points, the book is not perfect. On none of the drawings or light micrographs– including the frontispiece– is there any indication of size (a list of eye pieces and objectives used to take the pictures [p. 9] is not sufficient). This *is* provided in the captions of most of the SEM's and TEM's but not in those of Figs. 28, 225; or of 2, 3 and 7 in appendix I and of 7 in appendix II and incorrectly in those of Figs. 102, 161, 162, 228 and 247. In Figs. 88 and 163, the TEM was rotated after the caption was placed so that the directions mentioned are incorrect. The plane of section indicated in the caption is incorrect for Figs. 19, 72, 156–158, 223, 236, 238 and 239, is missing from others (Figs. 58, 109, 238, 239, 247 b and c and most TEM's) and there are labelling errors on Figs. 21, 53, 67, 83, 138, 139, 150–152, 167, 171, 175, 218, 235, 238, 239, and 248–250. In Fig. 21, the longitudinal axis of the antenna is the reverse of what the authors suggest by their labelling, and Fig. 53 is of a nucleus not a secretion vacuole. The introductory comments for each organ system are sometimes awkwardly written (p. 91) and fail to refer to Schlein's drawings at the front of the book. This is unfortunate since knowledge of these will assist readers in interpreting the positions of sections. In addition, some of these paragraphs contain errors in fact: p. 91– "hatching" for "eclosion"; "sustentacular" cells in insect testes are usually known as "cyst" cells; p. 125– sensory dendrites, not nerves, are associated with each seta. Finally, in the section treating the male reproductive system, the authors could have gone farther in interpreting the stages of flea spermatogenesis illustrated. In Fig. 138 the "spermatocytes at the stage of mitosis" (8) are actually primary spermatocytes in pachytene of prophase I (Fig.152). Also illustrated in Fig. 152 are spermatids (cyst at upper left).

In spite of these quibbles, this is an important book. The structure of insect tissues is basically the same in all insects and detailed knowledge of this in fleas will greatly assist one in recognizing comparable tissues in sections of other insects. The beauty of the photomicrographs should convince workers labouring in more "exciting" fields that study of insect histology also has its delights.

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